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THE RELATIONSHIP OF VETERINARY SCIENCE TO AGRICULTURAL AND MEDICAL SCIENCES *

I. *By* REGINALD LOVELL

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Civilisation dawned when men discovered how to cultivate edible plants, to tame and breed animals and birds, and to construct shelter for themselves. The cultivation of foodstuffs, the breeding of animals for food, clothing and transport constitutes what we know to-day as agricultural science and this is closely linked with an adequate food supply which is essential to the health and well-being of the human race. The health of the human race is the business of medicine and medical science consists of the study of those factors and trends which are detrimental to the health and well-being of mankind. It embraces a variety of studies such as anatomy, physiology, pathology with its ramifications of bacteriology, haematology and biochemistry. Medicine is not a self-sufficing entity; it applies to the care and prevention of disease, knowledge and methods drawn from a wide variety of ancillary sciences. The word ancillary is used in the sense that these sciences have services they can offer to medicine and is not meant to imply that it is their business to be the servants of medicine. In fact, medicine has had to wait on many occasions until other branches of science were ready to solve its fundamental problems and instruct it how to act. Medicine is sometimes slow to accept and apply the knowledge gained by these so-called ancillary sciences. Claude Bernard —a physiologist—was showing how the body worked during the latter half of the 19th century when one of the Parisian physicians remarked " Physiology can be of no practical use in medicine, it is but a *science-de-luxe*, which could well be dispensed with." During the same period and in the same country Pasteur was unable to convince the physicians that his studies on bacteriology and infective disease were of value to medicine.

Veterinary science may be considered to be an ancillary science by medical men and by agriculturalists. It is, however, not the business of veterinary scientists to be ancillary except that they have something which is valuable to medicine and agriculture. As a science, veterinary medicine stands alone and is subordinate to none. In actual fact it forms a bridge and link between agriculture and medicine. It is patent that the service rendered by veterinary science to agriculture and to medicine has not been appraised at its true worth. The production of an adequate food supply, especially foods of animal origin—meat, meat foods and dairy produce —constitute a vital part of that food supply which is necessary for a healthy population. The maintenance of the health of our herds and flocks is of paramount importance especially at a time of world shortage of food. The elucidation, control and prevention of animal diseases, which constitutes a large part of veterinary science, is a bridge between agriculture and medicine. Without that control and the knowledge which is applied, the human race would starve and be decimated by diseases which attack a population deficient in its nutritional requirements. Diseases which attack animals or have animals as their reservoir host would be unchecked at their source and be an ever present menace to mankind. It would have been a major catastrophe had veterinary science failed during the two recent world wars. This is history, but history of which veterinary scientists may be proud.

Although agriculture and medicine may consider veterinary science to be an ancillary one and even though it serves both agriculture and medicine it is not the main business of veterinary science to serve either or both. It stands by itself, glad and willing to offer service to both for the welfare of mankind. If agriculture and medicine are wise then their respective exponents will see what veterinary science has to offer and what services can be rendered. It has been implied that veterinary science is often in danger of being crushed between the two; bridges are not crushed without disaster to both sides of the chasm which is bridged.

Fundamental advances made in veterinary science have frequently been applied to human medicine with sometimes spectacular results. The history of immunology would be incomplete without reference to the association between cowpox and smallpox and the practice of vaccination initiated by Jenner in 1796 or the researches of Pasteur on the immunisation of animals and birds against anthrax and fowl cholera respectively. These studies led directly to immunisation against a variety of human diseases. The story of viruses and the diseases to which they give rise provides another example of a link between agricultural and medical sciences. The first evidence of the existence of viruses is found in the work of Ivanovski on tobacco mosaic and of Loeffler and Frosch on foot-and-mouth disease. The earliest concept of an arthropod as a carrier of infective disease was due to the work of Smith & Kilborne in 1889–93. It is true that Manson had demonstrated the presence of the parasite of filariasis in mosquitoes in 1879 but the phenomenon was regarded as an isolated one. It remained for Smith and Kilborne in a series of planned experiments to demonstrate the importance of the tick vector in Texas fever; this opened up the way for similar studies on Trypanosomiasis in animals and man and on yellow fever and other diseases of man. The studies of Ross on the transmission of malaria were made mainly on the comparable disease in birds, but the final triumph of demonstrating the transmission of the human disease was given to Grassi. Distemper in dogs was investigated in the ferret by Laidlaw & Dunkin and this technique opened the way for the researches of Laidlaw and his colleagues in human influenza, the same experimental animal being used for both fields of work. It remains to be seen whether the work of Shope on the harbouring of the swine influenza virus by parasitic lung worms has its counterpart in human medicine.

The experimental work on nutrition, heredity and eugenics is performed on animals and many observations in these fields play their part in the elucidation of problems in agriculture and medicine. The main object of these studies in the animal world is for the express purpose of increasing and improving

* Contributions made in opening discussion of this subject at the meeting of the Association of Veterinary Teachers and Research Workers held at the Royal Veterinary College, N.W.1., on April 21st, 1949.

the meat, wool or milk produced. They are economic and agricultural studies, and medicine may learn many lessons from the results obtained. Eugenics is mainly the study of the reproduction of human offspring and the scientific breeding of plants and animals is an ancient study on which the present knowledge of eugenics largely is based. No wild plant exists of the same species as wheat ; the modern cow is very different from any wild animal that ever existed ; the racehorse is a highly artificial product. Perhaps the human race may be comparable in this aspect but the fact remains that many of these studies are part of veterinary science and they have given guidance to the study of eugenics and also assisted agriculture. Artificial insemination is a well-established practice in farm animals and guided largely by students of veterinary science. It is a thorny subject when considered in its application to the human race ; whether to be advocated or not is beside the point ; its technique has been improved by students of animal breeding.

A close link exists between the infectious diseases of animals and man and a few examples suffice to emphasise this. The reservoirs of *B. anthracis*, *Pf. mallei*, the types of Brucella, and the viruses of rabies and psittacosis are animals and birds. The control of such infections is the business of the veterinary surgeon and is essential for agriculture and as a safeguard for human beings. Furthermore, the aetiology of human diseases is frequently elucidated by comparison with similar infections in animals. *Bact. coli* is capable of killing calves, a fact known for many years. It is only recently that medical men are beginning to realise that micro-organisms which are non-pathogenic for adults may cause disease and death in the newborn.

It is also a source of gratification that on occasion men with a primary veterinary training have contributed directly to the solution of medical problems. Feldman, a veterinary surgeon, is one of the world's authorities on tuberculosis ; Llewellyn Bevan showed that human beings suffered from infection with *Brucella abortus*. Ramon contributed largely to our understanding and control of human diphtheria and Coombs is adding to our concept of haemolytic diseases in the young of man and animals. Fleming discovered penicillin and Florey and his colleagues placed it on a therapeutic basis ; though penicillin is frequently referred to as a major medical discovery the link between the work of the authors cited was provided by two chemists and a veterinary surgeon.

In many fields of study affecting both agriculture and medicine, veterinary science and veterinary workers have contributed, to new concepts of natural phenomena, to a fuller understanding of the epidemiology and control of diseases affecting man as well as animals. Encouragement for the contributions made in these fields and by these workers is sometimes meagre, the advancement and emoluments may be less than in other fields, but to a company of veterinary teachers and research workers one may say " There is a heritage and there is work, the importance of which is not easy nor possible to assess ; the work is of more importance than the worker."

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II.—*By* HUGH PLATT

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The veterinary profession in many ways is faced with a peculiarly difficult problem when the question is raised of its relation to other sciences, because it is intimately connected with so many. On the one hand, the veterinarian is required to be fully acquainted with all those fundamental disciplines which are essential for the understanding of the functioning mammalian organism in health and disease ; that is to say, the sciences of physiology, biochemistry, pathology and so on. This responsibility is one which he shares with his medical colleague, but in addition, the recent advances in the very varied branches of agricultural science make equally great demands upon his attention. Soil chemistry, animal husbandry and genetics, as well as nutrition are only a few of the facets of agricultural science which are of immediate and practical importance. As a result, the veterinary worker is required to take a very broad view of animal disease. Such an outlook on disease is undoubtedly desirable, but the very breadth of our range of interests raises many difficulties, particularly as the profession is numerically a small one.

The closest link between the medical and veterinary professions at present, is undoubtedly in the sphere of public health administration. Co-operation here is of long standing and is continually widening. Many diseases which were regarded in the past as exclusively the province of the veterinary worker, are now coming to be recognised as at least a potential danger to the human subject. Several of the neurotropic virus diseases of animals and many other infections which primarily affect animal hosts, may, under suitable conditions, be a menace to human health. The various species of Leptospira, which find their host of choice in a variety of animals, are now recognised as a more frequent cause of human disease than had hitherto been realised. That is only one contemporary example, and there can be little doubt that in the future, the interest of the public health authorities in veterinary medicine will widen progressively.

I do not think, however, that public health can be regarded as more than a small part of what might be a much larger field of co-operation between the two professions. As far as the veterinary profession is concerned, public health may be regarded as the practical application of knowledge which has been gained of the inter-relationships of human and animal infections, to the prevention of human disease. Such knowledge must first be acquired and this can be achieved only by close liaison between the workers in the two fields, in an attempt, not only to understand the mode of spread, but far more important, to study the disease in all its stages in both human and animal hosts. If study of the disease is confined only to those aspects of the problem which have an immediate practical bearing on the actual transmission of the disease from animal to man, we should be neglecting the rich field of investigation which lies in the comparison of the responses of different species to the same stimulus or infecting organism. The systematic comparison of the varying pathological effects of a single disease process or pathogenic agent in several susceptible species has not been developed to the extent that it merits. The differences in response that occur from one species to another are well recognised but are often regarded merely as a part of the species' biological individuality. In the broadest sense, this is no doubt correct, but in some instances at any rate, it may well be possible to correlate these differences with definite anatomical, functional, physiological or environmental factors in the different species. Knowledge of such a nature may provide valuable and fundamental information for the understanding of the disease process as a whole. In the case of infections, for instance, which affect several species of animal, it seems to me that it would be better to regard the disease as a unity in which all its manifestations in the various susceptible species are taken into account, rather than to concentrate exclusively upon the species which, for ethical or economic reasons, happens to be of immediate importance. From the scientific, as opposed to the sentimental point of view, the lesions of a disease in the

guinea-pig may well prove to be as important as those of the same disease in the human subject.

This comparative approach to disease is clearly liable to lead to very fundamental problems, but I have no doubt that in the long run, it may well prove to be very rewarding, particularly as it may provide useful information for the solution of these problems. Fundamental knowledge is just as important in veterinary medicine as it is in human medicine if clinical work is not to become empirical. An increasingly greater proportion of scientific research is being devoted to fundamental work and this field is no longer the exclusive province of any one particular type of scientist. Organic and physical chemists, biochemists, biologists and even physicists as well as medical and veterinary workers are all contributing to an ever increasing fund of knowledge regarding the basic biological processes. In general, it is true to say that with a few notable exceptions, the veterinary profession has not contributed very greatly to fundamental research. Much of the research which has been carried out by veterinarians has related to the application of fundamental knowledge to the treatment or prevention of specific diseases in animals. This is undoubtedly to be related to the small number of veterinary research workers, but it is none the less regrettable as the profession is as fully qualified by its training to undertake such work as are members of other professions. Post-graduate specialisation would, of course, be necessary, but the basic training for such specialisation is provided by the curriculum of the veterinary colleges.

Many fields of study, which hitherto we have been content to leave to the medical research worker, are of great importance to the veterinarian. In these fields of comparative and fundamental research, the medical and veterinary workers can and should co-operate with great profit to both parties. A good example of this is in connection with cancer research, particularly in animals. The statistics with regard to the various types of animal tumour are quite inadequate and the knowledge which might be gained of the histogenesis of certain types of tumour by comparative study, may possibly be very valuable. There are a number of very striking peculiarities in the occurrence and distribution of animal neoplasms and some of these may not be without significance. For instance, one may cite the occurrence of epithelioma of the oesophagus in the cat and man but only very rarely in other animals, and the fact that carcinomata of the stomach and colon, which form so high a proportion of human neoplasms, are almost unknown in the dog, though the overall cancer rate in dogs is probably quite as high as that in man. It is at least a possibility that differences of this nature are related to environmental, nutritional or physiological differences in the species concerned.

It is highly desirable that work of this nature should be undertaken, at least partly, by veterinary workers, rather than by people in other fields who are often quite unacquainted with the naturally occurring diseases of the animals concerned, or with their environmental background and endocrine peculiarities. The ideal research unit for this type of work would include as a minimum both veterinary and medical investigators, preferably working in the same building.

In the sphere of fundamental research also, our unlimited opportunities for experimental work open up tremendous possibilities for veterinary medicine, which has therefore the chance of playing a leading role in the study of disease processes in general. The benefits of such study will be apparent, not only in the prevention and treatment of animal disease, but in human medicine also, since many of the fundamental facts accessible to veterinary research may be found to have a bearing on disease in man.

CLINICAL PAPERS*

SOME CASES MET WITH IN CANINE PRACTICE

By

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When asked to speak at this meeting I gathered from Mr. Dawes that the important thing was for me to stimulate a good general discussion, *i.e.*, make the title wide, the subjects mentioned controversial and the talk brief—so I have decided to make a few remarks on the treatment of the following :—

Pyometra
Secondary Uterine Inertia
Fractures Involving the Leg Bones.

Pyometra

Pyometra is a condition associated with an abnormal discharge in the uterus. Briefly the two main types are " open " or " closed "—although an alternative classification would be " sterile " or " infective," most cases being in the former class. The type most commonly met occurs six to eight weeks after " heat " when the bitch shows a varying degree of abdominal enlargement, marked thirst and vomiting, and slight general malaise ; at this stage there is generally a discharge from the vulva which varies greatly in consistency, quantity and colour. In a few atypical cases one will find only a haemorrhagic discharge, not bloodstained pus but apparently pure arterial blood. Cases are also met with in old bitches which have shown no sign of " heat " for a year or more.

Aetiology

This condition is now generally considered to be associated with an abnormality of the ovaries, but whether this is primary or secondary has not, I believe, been satisfactorily proved. On operation a large proportion of cases have cysts in the ovary and a fair proportion have a cystic condition of the uterine mucosa.

Prognosis

This should always be guarded and depends largely on the general condition of the patient and the type of pyometra.

Treatment

I have given a brief outline of the symptoms and aetiology of this condition as it is an essential introduction to the various lines of treatment. These may be broadly divided into (1) Surgical ; (2) Medical. I shall not make any further comments on (1) as I imagine the technique of this operation varies very little.

Medical.—I think here a short résumé of treatments employed during the last 10 or 15 years may serve a useful purpose.

(*a*) Douching with a two-way catheter—this, owing to the structure of the uterus and vagina, was not even a practical method of drainage and in any case did nothing to remove the cause.

(*b*) Prontosil with or without pituitrin—this in a certain percentage of cases gave temporary relief but no permanent cure.

* Presented to the Midland Counties Division, N.V.M.A., at Birmingham.

(*c*) Stilboestrol—with or without pituitrin. Stilboestrol was used for two reasons; first because it kept the cervix open and so materially aided drainage, second because it increased the blood supply to the uterus and so encouraged healthy regeneration of the uterine wall. In one year in which 16 out of 17 cases were treated, 50 per cent. of cases made a complete recovery and 25 per cent. made a temporary recovery. However, the following year the majority died. These results, I think, lend force to the theory that the cause of pyometra varies and that the different types are frequently indistinguishable clinically.

(*d*) Luteinising Hormone.—This method of treatment is still in the trial stage and nothing definite can be claimed, but the theory behind the treatment gives one cause to hope that this may at least be a possible alternative in cases where surgical interference is not feasible. The suggestion is that L.H. might cause the ovarian cysts to be replaced by corpora lutea and the cycle of the ovary returned to normal, with consequent benefit to the uterine mucosa. So far four cases have been treated by this method and all have made an apparent recovery; the first had a relapse but responded well to a second treatment.

Secondary Uterine Inertia

The true cause of this condition—absence of response of the uterine muscle to stimuli after labour has begun—is unknown, but the result is disappointing for the owner and usually means a Caesarian operation. Secondary inertia is of course most commonly found towards the end of a long and difficult whelping case, but it also occurs quite early on in the proceedings, when the bitch does not appear to be in any way exhausted. The following method of treatment has been tried out with success in several cases. First, any foetus presented at the pelvic brim should be removed with forceps, otherwise it may die and set up a metritis. Then completely anaesthetise the bitch for two to three hours. The anaesthetic employed has so far always been nembutal as this gives a long period of rest and does not harm the foetuses. On coming out of the anaesthetic the bitch may produce a pup unaided or may require an injection of pituitrin. This treatment can be repeated more than once during the same whelping, the theory being that the uterine muscle if given an opportunity to relax will then respond again to stimuli.

It is not recommended as a method to be employed for the first time on a new client at midnight. Your action may be misconstrued!

Fractures Involving the Leg Bones

I am presuming that everyone knows and is agreed upon the standard classification of fractures and also that there is no need to enlarge on the various causes.

Treatment may be classed under four headings: (*a*) Cellona Casts; (*b*) Thomas's Splints; (*c*) Slings; (*d*) Masterly Inactivity.

(*a*) *Cellona Casts.*—These look very professional and are most satisfactory for the distal parts of the legs. Except in the hands of an experienced artist, however, they may cause much discomfort to the dog and not even ensure immobility of the affected bones when used in fractures at the proximal end of the fore leg as far as and including the elbow joint, and in the hind leg, to half way down the tibia.

(*b*) *Thomas's Splints.*—These, if efficiently made and not resented by the patient, can be an extremely useful method of reducing and immobilising fractures of the long bones with displacement. But unless well made, they may cause friction and discomfort to the dog and be little or no use in immobilising the fracture.

(*c*) *Slings.*—These, if made of mutton cloth, may be a comfortable method of giving partial support to fractures at the proximal end of the fore leg, when neither (*a*) nor (*b*) are being attempted.

(*d*) *Masterly Inactivity.*—This title speaks for itself. In fractures of the hind leg above the hock where splinting is difficult or, in some cases, impossible, it has been found that by confining a dog in a small space so as to allow the minimum amount of movement, very satisfactory results are obtained.

These comments on fractures may appear crude but frequently a general practitioner is faced with economic factors which have to be taken into consideration, and if the end result is satisfactory that is surely the important point.

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OBSERVATIONS ON THE TREATMENT OF EQUINE COLIC

By

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My reason for choosing the subject of colic is two-fold: firstly, its rarity under present-day conditions is such as to make it a subject rarely discussed, and secondly, because I believe little or nothing has been published on colic since Caulton Reeks wrote "Common Colics of the Horse"—which would now have to be entitled "Uncommon Colics of the Horse." Incidentally, I have never seen a copy.

One must, of course, attribute the comparative rarity of the condition partly to the diminution of the horse population, and partly to the much more rational feeding they receive to-day. Few horses are stabled and fed highly now, spending most of their time out, and being fed according to the work done—which is usually of comparatively light character. The cases which one still sees seem to me to be in the main of different type from those one used to meet 10 or 15 years ago; there is much less violence and acute pain. Symptoms are usually those of dullness, the horse standing in a comparative stupor; or alternatively being restless, getting up and down—but rarely rolling and kicking in intense pain. I do not know if most practitioners have changed their treatment of late years, or if it is that my own ideas have broadened. I have come to the conclusions that the prime desideratum, more important even than the control of pain, is prompt evacuation; and that this is not to be attained by the Caulton Reeks method of stimulants, good as this was. Neither do I like the drastics arecoline and eserine (though combined with strychnine, they are of use), as they give the patient such intense pain. Rather do I pin my faith to carbachol and pituitrin-carbachol to stimulate the parasympathetic, and pituitrin to stimulate the involuntary muscle of the intestines and at the same time raise blood pressure. On one never-to-be-forgotten occasion I gave a 15·2 four-years-old polo pony with an obstinate constipation 2 c.c. carbachol + 3 c.c. pituitrin intravenously and simultaneously. The results were astonishing—within half a minute the pony went tetanic, fell down, staggered up and out of the box, evacuated copiously and gradually recovered. I found, however, that a further dose of 4 c.c. pituitrin intramuscularly was necessary to promote regular peristalsis. Since this experience I give 2 c.c. of carbachol subcutaneously, followed by a further 2 c.c. in ten minutes, and 4 c.c. of pituitrin intramuscularly between the two.

The foregoing remarks may tend to suggest that I neglect the analgesic side of treatment of colic; I do not do so, as I believe that, especially in older horses, pain itself will kill. The aim must be to use an agent which will relieve pain without reducing peristalsis; for this reason morphine and belladonna and their derivatives are contra-indicated though morphine in a *maximum* dose of 4 grains is sometimes of use. When obtainable, novalgin solution (Bayer) was a valuable analgesic in doses of 50 c.c. given intramuscularly. Chloral hydrate is probably the best agent to use, in doses of ½ to 1 oz. in 10 per cent. solution given intravenously; or given by the stomach tube in doses of 2 to 3 oz. according to the weight of the horse and severity of symptoms. I must plead guilty to giving at the same time a mediaeval nostrum of mag. sulph., sodium chloride, pot. nit., and ol. tereb.; and am convinced that while this may be bad theory it is good practice.

I offer these observations in the hope that, simple and personal as they are, they may be found to provide a basis for some disagreement and subsequent discussion. Particularly do I hope that some mention will be made of differing causes and types of colic—which is after all merely a symptom. My own view is that, while it is important to distinguish between impaction of the stomach (as pumping in of a quantity of fluid, unless it be to syphon off again, will merely exacerbate symptoms) and impaction of the bowel, it is comparatively unimportant to distinguish between say flatulence and impaction. If evacuation, which is only rarely helped by enemata, is prompt and symptoms are treated as they arise, the outcome of the case, unless volvulus is established, almost invariably will be favourable.

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SOME OBSERVATIONS ON SHEEP PRACTICE IN SOUTH SHROPSHIRE

By

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Pregnancy Toxaemia

The typical symptoms associated with this condition are—incordination of the limbs, inappetence, blindness, and death, the mortality rate being highest in animals a long way off lambing and more favourable progress being observed when parturition is impending. The use of stilboestrol as an aid to this end has been tried, but results were not conclusive. Varying injections of calcium, magnesium and a combination of both have been used—again with varying results. On *post-mortem* examination the liver shows fatty changes and it is thought that the cause is some disturbance in metabolism. The condition is very common in districts where deep snow has made it difficult for sheep to move about freely and it has been noticed that exercise appears to be helpful in preventing an outbreak.

Lamb Dysentery

Lamb dysentery has not been the scourge in this part of the country that it has been in many others.

Tetanus

Tetanus occurs sporadically and usually follows the operation of castrating or docking. On known infected premises tetanus antitoxin is best given as a prophylactic following accidents and operations.

Strike

Strike is caused by *Clostridium welchii* Type D and is fairly common in sheep of all types and ages. Diagnosis is only certain following pathological examination of contents of the small intestine. The disease is most commonly seen following a change of grazing or diet, *e.g.*, from meadows to leys, or leys to beet tops. The onset of the disease is very rapid—often the animals being found dead. It is suspicious of "strike" if several carcases are found with excess peritoneal and thoracic exudate. The kidneys may or may not show macroscopic changes.

Experiments have been carried out on this disease in co-operation with Harper Adams College and Burroughs Wellcome Co. over a period of two years. A single injection of *Cl. welchii* anaculture was given about a month before the flock was to be moved on to the roots and it was shown that the losses from "strike" in the inoculated groups were appreciably less than those in the control groups.

Joint Ill

Losses from this disease sometimes attain almost epidemic dimensions. Cultural examination was carried out in two recent outbreaks and *Strept. viridans* was found. In these cases administration of sulphapyridine *per os* proved to be a specific if the affected animals could be found in the early stages of the disease.

Orf

This condition occurs sporadically and can give symptoms which are very alarming to the shepherd (especially when foot-and-mouth disease is prevalent in the district). Acriflavine emulsion 1 : 1,000, used daily on the affected parts, usually produces a cure within a few days.

Internal Parasites

Parasitic Gastro-Enteritis.—The beneficial use of phenothiazine in the treatment of this condition was very marked.

Fluke.—This condition is not very prevalent.

Fly-Borne Diseases

"*Strike.*"—DDT dips were useful in controlling the flies and so preventing this condition.

"*Vulvitis.*"—An outbreak of this in a flock of Oxford ewes which had been docked very short was quickly controlled by the use of DDT.

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FOUL IN THE FOOT IN CATTLE

By

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A case of foul in the foot, until recently, had been one of those that one had never relished—the case that could rarely be attended with satisfaction. It usually meant one or many maulings, for oneself and even more for the farm attendants, often with only very gradual improvement, and frequently ending with an emaciated patient only fit for the knacker. Altogether, a costly and extremely arduous task for the owner, with no bouquets for the veterinary surgeon.

Now, with the discovery of the intravenous injection of certain sulphonamides, foul in the foot becomes an interesting and in most straightforward cases a scientifically and spectacularly curable condition.

The term "foul in the foot," used in its widest sense, indicates any necrotic or suppurating lesion affecting any part of the bovine foot. Truly, however, it should be restricted to the interdigital space.

The essential cause is bacterial, but as in most other diseases, certain factors, such as injuries, bruises or occasionally wet or dirty conditions, seem to play a predisposing part. The disease sometimes appears to take on a contagious form, several cases occurring within a short period, and all are affected to about the same extent. In the majority of instances, however, it is confined to one animal. Most cases of foul in the foot seem to occur, unfortunately, in the hind feet, probably on account of their nearness to the dung channel and their thus greater liability to soiling from urine and faeces.

In the average case, *Fusiformis necrophorus* is the causative organism, though it is often accompanied in some degree by secondary infections. It is a common belief that a certain virus first invades the tissues and lowers the resistance still further, permitting the *Fusiformis* organisms to establish infection.

Fusiformis necrophorus exists as a saprophyte and is found in large numbers in the alimentary canal and faeces of all herbivora. It will grow only under anaerobic conditions, and it is pathogenic only when it gains access to the tissues. In any lesion, the organisms are found only at the periphery of the lesion, where the healthy and necrotic tissues join.

On gaining access to the tissues of the foot, either through a wound or through the devitalised skin, the *Fusiformis* organisms multiply and elaborate a toxin which kills the surrounding local tissue, producing the typical necrotic patch —a true diphtheritic membrane. This disease process, together with secondary infection, may penetrate more deeply into the foot and cause a tendonitis or synovitis with sinus formation, or more deeply still to reach and infect the corono-pedal joint, causing septic arthritis and osteitis.

The symptoms of all these stages of foul in the foot vary from slight lameness, slight swelling and no necrotic lesion to marked lameness, marked swelling with an extensively necrotic and suppurating interdigital region with sometimes sinus formation and maybe gross deformity of the whole foot.

A condition recently met with, is an infection, presumably with *C. pyogenes*—between the horny sole and sensitive laminae. It is characterised by acute pain of the affected claw, with lameness and emaciation, but with no swelling whatsoever and no visible lesion.

The prognosis of a straightforward foul in the foot where there is no gross secondary infection is very good. Where there are secondary complications—sinus formation, diffuse suppuration and deformity of the foot—the possible necessity of amputation of the affected claw must be suggested to the owner. In all cases of amputation, providing the remaining claw is unaffected, the prognosis is very good.

The use of sodium sulphapyridine, sodium sulphamezathine, and sodium sulphathiazole in the treatment of foul in the foot has been tried in all parts of the country, with such consistently good results that *Fusiformis necrophorus* must be considered to be one more of those organisms against which has been found a specifically acting drug. By mouth, these sulphonamides have a bacterio-static action, but high concentrations intravenously are bacteriocidal.

Sodium sulphapyridine is the drug of choice in this country and it is easily available.

Treatment by S.S.P. Injection

No method has yet been adopted for standardising the dosage of S.S.P. according to weight, but a dose of 60 g. appears to produce optimal results in the average adult bovine.

Care must be exercised in the preparation and use of this solution, owing to its acutely irritant nature, both to perivascular and intravascular tissue. Permeation subcutaneously causes a marked reaction, with sloughing and suppuration. Inside the vein it has been known to cause thrombosis.

60 g. of S.S.P. powder are dissolved in 500 c.c. of boiling water. This solution is allowed to cool and then carefully filtered into the container from which it will be injected. The solution is injected into the vein by gravity; preferably using a flutter-valve apparatus. The needle should be at least 2½ in. in length and of wide bore—about 0·116 in. This large size allows a free and speedy flow.

The cow is restrained by means of a neck chain or halter and bulldogs, the head being kept straight. The jugular vein —the right one if one is right-handed—is raised by means of a choke rope. The chosen site is clipped, sterilised and infiltrated with 1 c.c. of local anaesthetic. A short skin incision, about ½ in. long, is made longitudinally, and the needle directed through this and *well* inside the vein.

The choke rope is released gently, and the Flutter valve apparatus—after having filled the whole length of the tubing —is attached to the needle, and the solution gravitated in. Before removing the needle, first detach the F.V. apparatus and allow the needle to be flushed with blood.

It is frequent for milk secretion to be suppressed at the next milking after injection, but systemic reactions are rarely seen. Symptoms reported are of shock, lasting for several minutes, with muscular twitchings and spasms but ending in spontaneous recovery.

This treatment does not eliminate the need for cleanliness, and the owner should be instructed to keep the affected foot as clean as possible, dressing it at least once daily with some antiseptic lotion or powder. This applies especially in cases where there are suppurating areas.

Marked improvement, and usually complete recovery, can be expected—in the average uncomplicated case—within one to three days: pain and swelling disappear and the diphtheritic necrotic membrane drops away and is replaced by a healthy granulating wound.

In cases that do not show the desired improvement within four to five days, a second dose of S.S.P. may be given and antiphlogistine poulticing may be a help in bringing still more drug-laden blood to the lesion.

Suppurative conditions of the foot resulting from traumatic injury may defy even this treatment. Sulphonamides by mouth may be tried, or penicillin, *Corynebacterium pyogenes* toxoid and any local treatment.

Amputation of the Affected Digit

In cases that do not respond to any treatment, it may be assumed that the corono-pedal joint is infected. This leaves only two possible procedures—either slaughter of the animal or amputation of the affected digit—according to circumstances.

Where a case of foul in the foot is caught early, amputation is rarely necessary. The state usually arises as a result of neglect on the part of the owner. The cases quoted earlier on of infection in the sole, necessitated amputation.

The operation may be undertaken with confidence, and apart from any anaesthetic risk, a good prognosis can always be given. In many instances, the animal is in a very poor and pain-ridden condition, and improvement can be expected within a week. It is as astonishing a cure to some owners as is the S.S.P. injection.

Prior to the operation, the animal is starved for at least 18

hours; 2½ oz. of chloral hydrate are given by mouth, preferably by the owner, half an hour before the operation.

The cow is haltered and a chloroform mask is applied, with an initial dose of 2 to 3 oz. of chloroform. It is essential for safety's sake and the peace of mind of the operator, to have an experienced person giving the anaesthetic. I have had to do this operation with the aid of one cowman.

The cow is held loosely, and in most cases she will go down quietly.

Straight away, the foot is thoroughly cleansed and dried, any hair being clipped off if present. Shaving is not necessary. A tourniquet is applied above the fetlock, and the foot is laid on a clean cloth, in a comfortable position for operation.

With a mind freed from anaesthetic worries, a deep incision is made all the way round the claw at the coronet. This immediately indicates the depth of anaesthesia and adjustments can be made. Two vertical incisions an inch long are made from this primary incision, in front and behind the claw. The skin and subcutaneous tissue is dissected back, and two flaps are thus made. These two flaps are reflected back and a deep incision is made down to the middle of the os coronae. This bone is sawn through with a hack-saw, care being taken not to damage the adjacent tissues with the blade.

The tourniquet is relaxed, and the three main arteries will readily be seen. Haemorrhage may be arrested by packing, but more safely the vessels may be clipped off and ligated, the ligatures being part sewn through the perivascular tissue.

At this stage, the chloroform mask is dispensed with. The tourniquet is tightened and the edges of the skin flaps are pulled together with a single thick silk suture. The cavity thus formed is dusted with 1 oz. of sulphanilamide powder and plugged with a pad of cotton wool enclosed in gauze. The foot is tightly bandaged and then covered with a piece of sacking. The tourniquet is released.

Throughout the operation, especially if for some reason it is prolonged, watch must be kept that the cow does not become excessively blown, embarrassing respiration. If a trochar and canula has to be used, one of 2 to 3 mm. bore is ample at all times. The usual bovine canula is a shocking instrument.

The animal is allowed to get up at her own leisure, and can be left as soon as she sits up. She can be housed in the cow pen, tied up with a halter or head stall, or in a loose box.

The time taken from arrival to departure, providing everything goes according to plan, is about 30 to 40 minutes.

The dressing and plug are removed after 48 hours and the cavity is swabbed clean and dusted with an iodoform and sulphanilamide dusting powder, and again tightly bandaged. In some cases, especially where a hind foot is being dealt with, the cow may have to be cast. This first dressing is by far the most important and must be done thoroughly.

This treatment is continued every other day, by the owner if he is capable, and the importance must be stressed to him of keeping the bedding clean and dry.

After 14 days, the site is simply cleansed and dressed with dusting powder once daily and the foot covered with clean sacking.

All coverings can usually be dispensed with after three weeks, but the stump must still be kept clean. In dry weather, the cow should be turned out.

Mention must be made of the client who demands dressing for foul in the foot for his own use. Something must be provided, and the following makes a good dressing: a lotion containing half an ounce of formalin and half an ounce of caustic soda in 10 ozs. of water—the foot to be cleaned as gently as possible, a piece of cotton wool soaked in this solution pressed up between the claws and the foot kept covered—this to be repeated once or twice daily.

In concluding, may I express the hope that I have not appeared to insult anyone's intelligence by the simple and very elementary fashion in which I have described facts and procedures which most of you must know so well. However, my own mind is one that has to be tempted with such simple fundamental details to be able to grasp anything, and it is in this manner that I have tried to present this paper to you.

Addendum

Since this paper was given, sodium sulphamezathine has now largely replaced sodium sulphapyridine, in consequence of the smaller quantity necessary and the ease with which it may be administered. Apart from some pain on injection, no untoward reactions, either local or systemic, ever are produced. It is now rare for a day to pass without one of our clients wanting a cow "injected for foul."

100 c.c. of sodium sulphamezathine (33⅓ per cent.) are injected subcutaneously, and repeated on the third or fourth day in the event of this being necessary. In some stubborn cases when this has not been successful, an injection of S.S.P. will effect a cure.

Also, since this paper was given, and as a result of one of many criticisms during the discussion, my method of amputation has been altered slightly. Instead of sawing through the os coronae, it is simpler and just as effective to remove the os pedis and the whole of the os coronae, by dislocation at the suffragino-coronal articulation.

* * * * *

Discussion

Mr. W. W. Lang, discussing colic, recalled that when in 1921 he published his findings on the value of salt treatment the late Mr. Imrie said: "We shall soon know what colic is."—"Do we, or don't we?" asked Mr. Lang. Of Caulton Reeks Mr. Lang said he knew no one who gave greater credit in his writings to his colleagues. (Hear, hear.) He was in agreement with Noel Pillers, too—a fine clinician who stated his views in his paper "*Strongylus vulgaris* as a probable cause of colic in cart horses." Then there was the other great clinician, Dick Hudson, who had informed him of 30 consecutive deaths from impacted ileum; in his practice he was glad to say he now had favourable results. There was much to be said for the toxaemia theory, as there were in colic irregular, sometimes weak, nervous and muscular actions plus lessened intestinal secretion. Restoration to normal of these actions was the objective no matter what method or agent was used—he still favoured his own.

Diagnosis was not always easy, but the tube was an invaluable aid. If no distress followed the administration of fluid one could eliminate the stomach or small bowel as the seat of the trouble. If, on the contrary, fluid was returned it was indicative as a rule of diaphragmatic hernia, embolism or stasis, if the quantity was slight; but if anything up to eight gallons was syphoned off the cause was impaction of the ileum, which might lead to rupture of the stomach if unrelieved. One patient had vomited continuously through the tube for 36 hours and recovered, others for 20 hours and nine hours respectively. In addition to leaving the tube ends in the stomach he now gave intravenously two pints of a solution of 5 per cent. salt and 5 per cent. sodium citrate—an excellent stimulus to peristalsis.

Similar intravenous medication was successful in the removal of sand from the double colon—two pints ol. lini being given into the stomach at the same time. This solution given intravenously was also of value in cases of shoulder lameness and his results were 13 cures to one failure. For the information of the meeting, Mr. Lang added that the failure was an old-established case and probably due to bone enlargement round the joint.

A specimen of thrombosis of the anterior mesenteric artery was passed round—the fibrous thickening of the arterial wall probably bringing about constriction of the nerve plexus and leading to chronic ill-health was well exemplified.

Mr. P. A. Sweeney said that he was interested in Miss Brancker's successful use of luteinising hormone in pyometra, as it might be indicated in cases ovarian in aetiology and the agents he had used had given poor results. The action of pituitrin was too transient, the congestion caused by stilboestrol aggravated the absorption of

toxins and ergotamine was often very painful in its action. With regard to surgical treatment, he regarded the prognosis of ovarohysterectomy as grave in most cases of acute pyometra, and in bitches over seven years of age, suffering from toxaemia and dehydration consequent to vomition, he preferred marsupialisation.

With all due respect to the part played by parasitic aneurysms and the ingestion of large quantities of fibrous food, he thought that the primary cause of the vast majority of uncomplicated cases of spasmodic colic was all too obvious. When unfit horses were put out to work, they sweated profusely, thus losing chlorides and water. To replenish this loss they drank large quantities of cold water which was quickly absorbed from an intestine whose immediate reaction was to go into a spasm. He thought that drugs stimulating peristalsis were contra-indicated in these cases and he used instead 40 c.c. of a 1 per cent. solution of nembutal, which relieved the spasm in about 20 minutes.

For impaction he gave 1½ lb. of sodium chlorate in three gallons of water by the stomach tube, and sod. chlor. and sod. cit. 2 oz. in two pints of water intravenously. He had one fatality with the latter injection. The patient collapsed before he had slowly administered half the injection. Mr. Lang might be able to explain this.

Mr. T. A. M. Chambers: In South Africa the theory held *re* pregnancy toxaemia in sheep was as follows: The animals fed well and stored up reserves of fat in their livers; then, if they were moved to poor pastures, they were unable to utilise this fat reserve owing to lack of carbohydrates in the diet and pregnancy toxaemia occurred.

Similar symptoms had been produced experimentally in non-pregnant ewes.

He added that sheep put on rich food invariably developed entero-toxaemia in areas subject to such diseases.

Mr. J. G. Murray asked Miss Brancker to elaborate on the use of oestrogens in the treatment of pyometra in the bitch. What oestrogen did she favour, what doses did she use, and what was the frequency of dosage?

Mr. Dwerryhouse (Mr. Murray continued) should be congratulated on the amount of extremely useful information which he had brought into a short paper. Mr. Dwerryhouse seemed to be completely satisfied with the use of phenothiazine in the treatment of parasitic gastritis. In the Ledbury district results were not so uniformly satisfactory. The drug appeared, during the past two years, to be giving disappointing results on certain farms. Investigation on one of these farms showed that a species of round worm insensitive to phenothiazine was implicated. It would almost appear that previous regular dosing with phenothiazine might have greatly reduced the population of phenothiazine-sensitive species and allowed the non-sensitive species to supplant them as the principal parasites. Had Mr. Dwerryhouse any similar experience?

With regard to pregnancy toxaemia, while calcium borogluconate had not appeared to give results as a therapeutic measure, it might be worth a trial for prophylaxis where an outbreak of the disease seemed likely to occur. In one flock of about 70 ewes five or six deaths occurred and then the remaining animals were each given half an ounce of calcium borogluconate subcutaneously. No further case of the disease occurred.

In addition to acriflavine emulsion a lotion of linseed oil, phenol, and crystal violet had given good results in the treatment of lip and leg ulceration.

Miss Brancker, in reply to Mr. Murray, said that in the past she used stilboestrol in doses of 2 to 5 mg. intramuscularly every three to four days, but she had now discontinued this method in favour of luteinising hormone.

THE CANADIAN VETERINARY MEDICAL ASSOCIATION

Announcing the inaugural meeting of a re-constituted Association, *The Canadian Journal of Comparative Medicine* says: "It is expected and hoped that the Association will be in a position to speak for Canadian Veterinary Medicine. It will not, and cannot, assume the responsibilities and privileges of the various provincial societies. It can, however, co-ordinate and consolidate their views and ideals and unite ten whispers into a single voice seeking to improve all matters dealing with veterinarians. A special appeal to be present is issued to those who must always form the backbone of the profession—the practitioners. It is of the utmost import that they should play the most important part in the affairs of the Association. Elsewhere there has been far too great a tendency for such associations to become unduly influenced by government officials and teaching institutions. This must not be permitted to happen here and the practitioner must play his part with the others; he too must have a sense of responsibility to the body corporate and practice what he professes to believe—that union is strength."

COLLECTION OF ACCURATE DATA ON THE INCIDENCE OF DISEASE

For some time now the Technical Development Committee of the Association, through a sub-committee, has been endeavouring to evolve a scheme for collecting accurate data on the incidence of disease in farm livestock in such a way as to give the minimum of trouble to the farmer and the veterinary surgeon concerned.

The sub-committee eventually drew up four forms and, with explanations, submitted them to the Ministry of Agriculture in the hope that the Animal Health Division might find it possible to put the scheme into operation. The Ministry, however, whilst expressing interest, felt at the time that there was not the manpower available to start this project but stated that if the Association could show by trials that the idea was one which could be worked and could produce useful information, it would then consider the matter again. Consequently, the sub-committee submitted a plan to the Technical Development Committee for trials to be conducted throughout the country to see how such a project would work in practice.

At its last meeting the Technical Development Committee agreed that the best method of enlisting the co-operation of the profession would be to publish in *The Veterinary Record* full particulars of the project, asking for volunteers to take part. We are, therefore, asking for 200 veterinary surgeons in practice to pick out from among their clients, ten willing to co-operate in this scheme for a period of a year. The herds should be of all types—designated and non-designated—and it is hoped in this way to obtain data from a cross-section of all types of herds up and down the country. It is proposed that the trial should start in the autumn of 1949. The work involved will be as follows:—

1. To induce ten clients to co-operate to the full.
2. To get farmers to record the various particulars required on three forms; a fourth form to be filled in by the veterinary surgeon.

All forms will be provided from N.V.M.A. Headquarters to the veterinary surgeons participating in the scheme. Form (4) will be approximately 3 ft. by 2 ft. in size and is to be on cardboard suitable for hanging in the cow byre. It will have room on it for particulars regarding 20 cows, and for additional numbers in a herd, a second sheet will be supplied. (The forms are reproduced on the opposite page)

In addition to publishing these particulars in *The Veterinary Record* they are being sent to the Honorary Secretaries of Divisions to enlist their co-operation in finding veterinary surgeons in practice who will take an active interest in this work. It is essential that herds included in the scheme should come from widely varying parts of the country.

Will any member who would be willing to co-operate, please notify the General Secretary, N.V.M.A., 36, Gordon Square, London, W.C.1 at an early date, and in due course, the required number of forms will be despatched.

Weekly Wisdom

William Moorcroft (1767-1825), *in the Journal which he kept on his travels, tells us of the severe method adopted in Central Asia of "conditioning" horses prior to a raid. "The ordinary system of feeding is barley, lucerne, and straw; this diet is very fattening, and no horse that is not fat to begin with can possibly be conditioned. The training is as follows: Work is gradually increased, no bulky food is given, nothing but a small quantity of barley and water once a day. The belly soon gets 'tucked up,' the muscles hard, the faeces small and hard. When the horse is 'fit,' the faeces put into a clean, dry cloth and strongly squeezed must not leave a stain, thus showing the absence of moisture."* [Sir Frederick Smith, *The Early History of Veterinary Literature and its British Development*. (1930) Vol. **3.** p. 12. (London: Baillière, Tindall and Cox)].

FORM 1

RECORDER'S RECORD

Veterinary Surgeon's Initials _____

Index	Name	Farm	Dates of Visits				
			1	2	3	4	5

FORM 2

FARM ECONOMICS FORM

Veterinary Surgeon's Initials and Index No. _____

Fill on first visit and correct annually

Acreage _____ Permanent _____ Quality _____

Acreage grazed by cattle _____

Feed purchased _____

	No.	Breed	Housing	Breeding	Grazing periods	Feeding
Bulls						
Cows						
In calf heifers						
Yearlings						
Heifer calves						

Ewes _____ Hoggs _____ Fattening cattle _____ Pigs _____

Milking _____ Stripping _____ Recording _____ Av. milk { Summer _____ Winter _____

Milk disposal _____ Normal sale of cattle _____

Vaccinations and tests conducted _____

	1st calf	2nd calf	3rd calf	4th calf	5th calf	Old cow
Age distribution of cows						

FORM 3

6-MONTHLY RECORD

Veterinary Surgeon's Initials and Index No. _____

To be filled at the farm by the recorder

Give ages of affected animals. Give what is known of the cause of loss of milk in individual cows and give extent of the loss

	No. at last record	No. now	Loss or disposed of	Infertility	Abortion	Loss of condition or of milk	Added
Cows (including 1st calvers)							
Served heifers							
Yearlings				.....	.....		
Heifer calves				.....	.....		

Vaccination and tests _____

Mastitis control _____

Other health measures _____

FORM 4

QUARTERLY RECORD SHEETS

No. Cows	Name or Number. Age.	Death, disposals and date. Reason or reasons.	Normal calving. Premature calving. Abortion or dead calf. Date, age of calf and sex.	Service dates. 1	2	3	4	Mastitis	Other conditions (e.g. foul, indigestion, retained afterbirth, worms, etc.)
1									
2									
3									
4									
5									

THE VETERINARY RECORD
October 1, 1949

DATA AND RECORDS IN RELATION TO DISEASE CONTROL

THE estimates of the ravages of disease in the livestock of the country which were compiled by the Survey Committee in the early years of the last war did much to arouse the interest of everybody connected with the industry, and a very important start has been made in the control of the major diseases affecting the nation's herds and flocks. If this immense task of disease control is to be furthered in such a manner as to be increasingly profitable to the owners and the nation, then the best possible direction and planning obviously is desirable. To this end the collection of accurate data on the incidence and location of disease in the animal population is a prerequisite.

The inadequacy of the data available regarding the reduced productivity consequent upon disease among farm livestock has been a matter of anxious discussion within the Association for many years. A good deal of information is forthcoming upon a few of the commoner diseases, but most of the available information has been derived from investigations undertaken primarily for specific purposes and, apart from the economic loss resulting from death or culling, little or no attention has been paid to the losses caused by decrease in productivity brought about by disease in the living animal.

It is also a matter of essential importance that careful records be maintained within individual herds of the effects of disease control measures applied by the veterinary surgeon. Such records collectively can, and do, denote, as nothing else can well denote, the real contribution which the profession is making to the increase in the provision of foodstuffs for the human population of the country, no less than they demonstrate concurrently the contribution which the profession is making to the economic well-being of the agricultural industry itself.

The Bureau of Records of the Milk Marketing Board has indicated the type of information which ought to be made available (see *Vet. Rec.* **60.** 587). It represents at this stage only a beginning and it is to be hoped that it will be extended greatly in the near future.

Reliable information can be secured only from thorough and wide enquiry based upon a large number of samples (herds, etc.) chosen at random, the enquiry being conducted by fully equipped scientific investigators. Once obtained, such reliable information would be of the greatest possible value for the following purposes :—

(*a*) To demonstrate the incidence and economic importance severally of the more common diseases.

(*b*) To indicate in what directions further investigations can be prosecuted most profitably.

(*c*) To suggest what measures of control or treatment can be put into operation most usefully.

(*d*) To obtain good evidence upon the efficacy of the measures of control or treatment so put into operation.

(*e*) To point out in what way particular farming practices and methods of husbandry affect the incidence and severity of any particular disease and so indicate the manner in which those practices and methods ought to be modified.

In this issue of *The Veterinary Record* a pilot scheme is outlined of an attempt to collect this information. The full year Milk Recording Scheme starting as it does in October, would appear to be the appropriate time to launch such a trial scheme. It is hoped, therefore, that the required number of volunteers will be forthcoming without delay in order that this scheme may be started as soon as possible.

ABSTRACTS

[Dosage of Caronamide Required for Inhibition of Renal Tubular Excretion of Penicillin in Horses. Doll, E. R., Wallace, M. E., & Newton, A. C. (1949.) *Amer. J. vet. Res.* **10.** 154.]

The author describes experiments to determine the influence of various doses of caronamide upon serum levels of penicillin in horses. The potassium salt of crystalline penicillin G was administered intramuscularly in doses of 500 units per lb. body weight in all dosage trials, and caronamide doses, which were administered both orally and intravenously, were measured in grammes per 100 lb. body weight. Blood samples for examination were taken from the jugular vein at one hour and at every hour thereafter, following injection. The initial dosage of caronamide required for optimum effect on serum level response appears to be 4 to 6 grammes per 100 lb. body weight intravenously and orally, immediately preceding injection of penicillin. It is suggested that caronamide may be useful in veterinary therapeutics for establishing high serum concentrations at the initiation of treatment, thus combating such organisms as are resistant to the antibiotic at ordinary serum levels.

J. M.

* * * * *

[A New Technique in the Treatment of Abscesses. Emmerson, J. (1949.) *Vet. Med.* **44.** 152-154.]

The author describes a new technique for the post-operative treatment of abscesses using glycerite of hydrogen peroxide at a strength of 2·5 per cent. The method of application, by means of a tampon saturated with the solution inserted into the abscess cavity, is clearly illustrated in seven accompanying sketches. The dressing is renewed every two to four hours, according to the amount of pus or exudate in the abscess. The mode of action of the drug is described and the solution is said to be completely non-toxic. This treatment was found to be very valuable in the treatment of maxillary and anal gland abscesses and the period of hospitalisation was reduced from the ten days required with previous methods of treatment to four to six days with this method.

Glycerite of hydrogen peroxide may prove of value if obtainable in this country, in both large- and small-animal practice.

J. M.

REVIEW

[Principles of Veterinary Science. By Fredk. Brown Hadley. Pp. 521. Price 25s. W. B. Saunders, Philadelphia and London.]

" This book is not designed for students enrolled in veterinary colleges." With this sentence in the preface, the author makes the reviewer's task less invidious. The first two sections, on anatomy and physiology, are sound, as they are " potted " from standard authors (Sisson, Dukes, etc.). The third section, on medicine and disease, goes only deep enough to make the stockman or farmer realise that he should always send for his veterinarian and one cannot pass without comment such a statement, in a work published in 1949, as " Penicillin and streptomycin are now being used (in treatment of mastitis) with some promise of success "!

To sum up, this book is likely to be of use to livestock owners and attendants and may be of some help to veterinary surgeons who give lectures to agricultural students.

NOTES AND NEWS

Diary of Events

Oct. 2nd.—Meeting of the Central Veterinary Society at the Royal Veterinary College, N.W.1, 2 p.m.
Oct. 5th.—Meeting of the Lancashire Division, N.V.M.A., at Chester (The Queen Hotel), 2.30 p.m.
Oct. 5th.—Special Meeting of the North Wales Division, N.V.M.A., at Bettws-y-Coed (Glanaber Hotel), 2 p.m.
Oct. 7th.—Extraordinary General Meeting of the Royal Counties Division, N.V.M.A., at Reading (Caversham Bridge Hotel), 2.30 p.m.
Oct. 7th.—Meeting of the North of Ireland Division, N.V.M.A., at Belfast (Queen's University), 7.15 p.m.
Oct. 11th.—Scientific Meeting of the Zoological Society of London, Regent's Park, N.W.8, 5 p.m.
Oct. 14th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Grantham (The George Hotel), 2.15 p.m.
Oct. 19th.—Meeting of the Southern Counties Division, N.V.M.A., at Bournemouth (Grand Hotel), 6 p.m.
Oct. 19th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at the Royal (Dick) Veterinary College, Edinburgh, 2 p.m.
Oct. 27th.—Meeting of the South Eastern Division, N.V.M.A., at Maidstone (Royal Star Hotel), 2.30 p.m.
Nov. 12th.—Dinner of the Southern Counties Division, N.V.M.A., at Southampton (Polygon Hotel), 7.30 p.m.

N.V.M.A. Committee and Council Meetings

The following are the arrangements for meetings of Committees and Council of the Association to be held in London in November:—

Tuesday, November 15th:
11 a.m.—Parliamentary and Public Relations Committee.
2 p.m.—Organising Committee.
4.15 p.m.—Home Appointments Committee.

Wednesday, November 16th:
10 a.m.—Veterinary State Medicine Committee.
2 p.m.—General Purposes and Finance Committee.

Thursday, November 17th:
11 a.m.—**Meeting of Council.**

Friday, November 18th:
10.30 a.m.—**Special Meeting of Council.**

* * * *

PERSONAL

Birth.—HINDLE.—On September 21st, 1949, to Margery, wife of Capt. J. J. R. Hindle, M.R.C.V.S., a sister for Michael John.

. . . . .

Mr. J. D. Shuja, M.R.C.V.S., returned to Pakistan on August 14th, 1949, after a nine months' tour in the Commonwealth of Australia. Mr. Shuja led the Pakistan contingent to the Pan-Pacific Jamboree held in Melbourne in December, 1948, and thereafter remained in Australia on deputation to investigate the pastoral industries of the Commonwealth on behalf of the Government of Pakistan.

* * * * *

14th International Veterinary Congress

Membership and Attendance Figures

Figures are now to hand concerning the membership of the Congress, which was as follows:—

Ordinary members	1,165
Associate members	312
Student members	77
Total	1,554

The attendance figure was 1,421.

* * * * *

Pharmaceutical Research

In his address to the British Pharmaceutical Conference, 1949, the Chairman, Dr. Norman Evers, took as his subject "Pharmaceutical Research," which, he said, he found hard to define. "Pharmacy is not a science in itself. It is an art which makes use of many sciences." The question, "what is pharmaceutical research?" could best be answered by considering the different types of investigation carried out with a pharmaceutical objective. These he listed as follows:—

1. The synthesis of new organic compounds with the object of discovering new drugs, and the examination of known compounds for new pharmacological properties.
2. The isolation and purification of the active principles of naturally occurring drugs, the elucidation of their structure and their synthesis.
3. Pharmacognostical research.
4. Research on methods of cultivation of vegetable drugs with the object of producing maximum potency.
5. Methods of preparation of drugs in a form suitable for administration, under which heading we may include the preservation and sterilisation of medicinal products.
6. The chemical and biological standardisation of drugs.

Organic Chemical Research

"The primary importance to medicine of organic chemical research needs no emphasis from me. The number of valuable synthetic drugs discovered in recent years provides sufficient evidence of this. The organic chemist must, of course, work hand-in-hand with the pharmacologist, who functions as a sort of compass and tells him whether he is moving in the right direction. Most research of this type is nowadays carried out by teams of workers, each approaching the subject with a special knowledge and skill. The organic chemist usually takes as his starting point some compound, either natural or synthetic, of known pharmacological action, and by modification of its structure, produces new compounds which he hopes will have an improved or modified pharmacological action. Modification of structure in the direction of simplification has proved a fruitful source of new drugs. Such simplification may have the advantage of substantially reducing the cost of treatment. Examples of this are seen in stilboestrol and related compounds which resemble in a much simplified form the structure of the natural oestrogens, and the new synthetic curarising compounds which are substitutes for the natural alkaloid, tubocurarine. These are comparatively easily synthesised and are very much cheaper. Sometimes such researches lead the chemist far away from his starting point. The series of researches which started out to produce an improvement on the antimalarial drug, mepacrine, ended with Paludrine, a compound of very different structure.

"Research of this type sometimes involves the production of hundreds of compounds in the laboratory. The discovery of a successful new type of synthetic drug is followed by feverish activity in organic laboratories in the production of compounds of a similar structure in the hope of finding an improvement on the original. The number of sulphonamides which have been synthesised since the discovery of the value of sulphanilamide is legion, but the number of real value in medicine is probably less than a dozen. Sulphanilamide itself provides an example of a compound which had been known for many years before its valuable bacteriostatic properties were realised. This emphasises the importance of thorough pharmacological testing of all new compounds. Sometimes, too, a variation of a compound having a certain pharmacological action may prove to be valuable for a therapeutic effect of quite a different kind. On the other hand, valuable drugs are sometimes discovered which bear no relation in struction to those previously known. The analgesic, pethidine, is modelled on the structure of morphine, but in amidone the relationship is scarcely recognisable. The new antihistamine drugs are of a type not hitherto used in medicine and have a novel pharmacological action.

Selective Activity

"The most remarkable development of recent years has been the discovery of drugs which act selectively on species of living organisms or upon one particular type of cell or enzyme. The antibiotics, antimalarials, antrycide, etc., are examples of drugs acting selectively on certain organisms. Antihistamine, antithyroid, anticholinesterase and curarising agents are examples of selective poisoning of certain types of cells or enzymes. Increased knowledge of chemical constitution and its relation to pharmacological action, of the causes of disease and of the nutritional requirements of organisms makes the task of the organic chemist less subject to chance than it used to be, but we are still a long way from being able to design a new drug like a machine on a drawing board.

Naturally Occurring Drugs

"The second type of research to which I have referred deals with the isolation and purification of natural drugs, the determination of their structure and synthesis. Recent discoveries have shown that Nature still has something up her sleeve. A few years ago it might have been thought that it was unlikely that any new natural drugs of value would be discovered and that the future lay with synthetic organic chemistry. Then came penicillin—to show us an entirely new type of drug from an entirely new source—a compound with a new sort of structure, and one, moreover, that has not yet been synthesised except in minute quantity in spite of the efforts of some of the finest organic chemists in the world—a blow to the pride of those organic chemists who might have been inclined to

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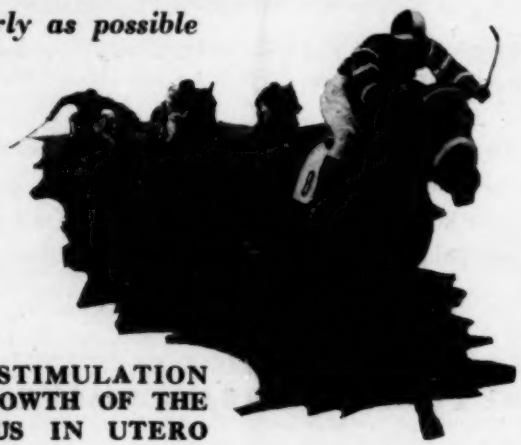

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